

REMARKS

Claims 1-11 are pending in the present application and are rejected. Claims 1 and 7 are herein amended.

Applicants' Response to Claim Rejections under 35 U.S.C. §112

Claims 1-11 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the applicant regards as the invention.

The Office Action indicates that claims 1 and 7 lack sufficient antecedent basis for “the engagement degree” and “the revolution rate.” In response, Applicants herein amend claims 1 and 7 in order to provide for correct antecedent basis. Favorable reconsideration is respectfully requested.

Applicants' Response to Claim Rejections under 35 U.S.C. §102

Claims 7-11 were rejected under 35 U.S.C. §102(b) as being anticipated by Suzuki (U.S. Patent No. 6,342,027).

It is the position of the Office Action that Suzuki discloses the invention as claimed. Suzuki is directed at a hybrid motive power vehicle having an engine 2, an electric motor 1, a start-up clutch 7, a CVT transmission 4, and a buffer clutch 5. Suzuki describes a method for switching from driving by the motor to driving by the engine in Figure 2, and at column 6, line

13 to column 9, line 64. However, Suzuki does not disclose a method for switching from driving by the engine to driving by the motor.

The switching operation begins at a time t_0 . At this time, there is no fuel injection into the engine, and the throttle is closed (Th_0). The internal combustion engine has an rpm of 0, but begins to rotate, and has a torque of $-Te_1$. At this time, the electric motor torque is increased from T_{m1} to $T_{m1} + \Delta T_m$. The start-up clutch 7 is changed from a disconnected state to a half-connected state, and the buffer clutch 5 is changed from a fully connected state to a half-connected state. See column 7, lines 17-27. However, it is noted that Figure 2(g) illustrates a change from fully connected to a state between half- and fully-connected.

At time t_1 , fuel injection begins intermittently and the throttle is opened to Th_1 . As a result, the engine reaches starting rpm Ne_1 . After t_1 , the engine torque Te increases, and the electric motor torque T_m decreases. The start-up clutch 7 remains half-connected, and the buffer clutch 5 remains in a half-connected state.

At time t_2 , the fuel injection is raised to a normal level, and the engine rpm reaches a target value Ne_2 . At this point, the electric motor torque returns to its value of T_m prior to the switching operation, and the engine torque returns to its value of 0 before the switching operation. The start-up clutch 7 changes from the half-connected state to a fully connected state, and the buffer clutch 5 remains half-connected.

Finally, at time t_3 , the switching is completed. The throttle open degree reaches its target value of Th_2 , and the engine torque reaches its target value of Te_1 . Meanwhile, the electric motor torque is reduced to 0, and the buffer clutch 5 is reconnected in a fully connected state.

In response to the rejection, Applicants respectfully submit that Suzuki does not disclose the clutch control apparatus of claim 7. In the present invention, the use of the clutch prevents drag as a result of engine friction due to starting or stopping of operation of intake and exhaust valves. See page 2, lines 16-23. Suzuki does not disclose any change in the operation of intake and exhaust valves, only changes in throttle and fuel injection. Furthermore, Suzuki discloses a startup clutch 7 disposed between the electric motor 1 and the transmission 4.

Claim 7 recites that “the engagement degree of the clutch device is *gradually increased* and recovered.” This is done in order to smoothly switch between motor and engine power without a jolt due to the change in engine friction, as discussed above. As illustrated in Figures 2 and 3, the engagement degree of the starting clutch 12 is modified such that it initially drops to KCLEV1, but returns to a starting level by stepwise increases in oil pressure. On the other hand, in Suzuki, the clutch engagement of the buffer clutch 5 is decreased from fully connected to half-connected in one sudden change at t_0 . More importantly, the re-engagement from half-connected to fully-connected is performed in one sudden change at t_3 . See Figure 2(g). In fact, Suzuki specifically states the following:

Moreover, what is necessary is only to provide the buffer clutch 5 in the power train system 3 and to control the buffer clutch with binary control 5 between the complete connection state and the half-clutch state. Accordingly, there is no need of complicating the configuration or control. Moreover, when the transmission 4 is replaced by a manual transmission, the buffer clutch 5 is arranged at the down stream from the transmission. The speed change can be carried out with this buffer clutch 5 in the half-clutch state, so as to suppress the torque fluctuation generated at the down stream of the power train system 3, enabling to obtain stable running.

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Accordingly, Suzuki does not disclose or suggest that “the engagement degree of the clutch device is *gradually increased* and recovered,” as required by claim 7. Thus, Applicants respectfully submit that Suzuki does not disclose all claimed features of the present invention, and therefore that the rejection is improper. Favorable reconsideration is respectfully requested.

Allowable Subject Matter

The Office Action indicates that claims 1-6 would be allowable if rewritten or amended to overcome the rejections under 35 U.S.C. §112, second paragraph, as discussed above. In response, as discussed above, Applicants herein amend claim 1 in order to provide for correct antecedent basis. Thus, claims 1-6 should be indicated as allowable in the next Office Action.

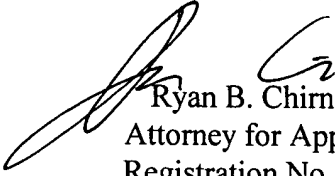
For at least the foregoing reasons, the claimed invention distinguishes over the cited art and defines patentable subject matter. Favorable reconsideration is earnestly solicited.

Should the Examiner deem that any further action by applicants would be desirable to place the application in condition for allowance, the Examiner is encouraged to telephone applicants’ undersigned attorney.

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If this paper is not timely filed, Applicants respectfully petition for an appropriate extension of time. The fees for such an extension or any other fees that may be due with respect to this paper may be charged to Deposit Account No. 50-2866.

Respectfully submitted,
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